HEAT EXCHANGING DEVICE HAVING HEAT EXCHANGING HOUSING

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a heat exchanging device, and more particularly to a heat exchanging device having a limited heat exchanging housing for increasing the heat exchanging effect.

2. Description of the Prior Art

Typical heat exchanging devices are primarily provided for heat exchanging between fluids or the like. As shown in FIG. 1, the typical heat exchanging devices comprise a receptacle or a tank 10 including a chamber 11 formed or provided therein for receiving a tubing 12 therein and for receiving a fluid, such as a heat media or the like therein, which may flow into the tank 10 via an inlet 15, and may flow out of the tank 10 via an outlet 16. The tubing 12 includes an entrance 13 for receiving the other fluid, and an exit 14 for allowing the fluid to flow through and to flow out of the tubing 12, and for allowing a heat exchanging to be occurred or actuated between the fluids received in the tank 10 and the tubing 12. The fluid received in the chamber 11 of the tank 10 may have a heat exchanging effect itself, and the heater or the heated fluid may flow upward to force the colder or cooler fluid to flow downward. However, it may take a long time to have the fluid received in the tank 10 to be heated to a

required temperature. In addition, once the heated or heater fluid partially flows out of the tank 10, the colder or the cooler water may flow into the tank 10 and mixed with the heater water in the tank 10, and the temperature of the other portions of the fluid may be quickly lowered by the other fluid newly flowing into the tank 10.

As shown in FIG. 2, illustrates is another heat exchanging device or a heat tank which includes a heater 17 for heating the water received in the tank 10. Similarly, once the heated or heater fluid partially flows out of the tank 10, the temperature of the other portions of the fluid may be quickly lowered by the other fluid newly flowing into the tank 10, and it may further take a long time to have the fluid received in the tank 10 to be heated to the required temperature. The water or the fluid may not be heated quickly. In addition, the tank 10 is subjected with a high pressure and should be made into a cylindrical shape for preventing the tank 10 from being broken. However, the cylindrical tank may occupy a large volume and may not be easily disposed in the corner area of the building. Furthermore, the water flowing into the tank 10 may carry calcium or the other elements into the tank 10 and may be accumulated on or around the heater 17 which may then be easily damaged because the heat or the high temperature of the heater 17 may not

be transferred to the fluid due to the accumulated calcium.

The present invention has arisen to mitigate and/or obviate the afore-described disadvantages of the conventional heat exchanging devices.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a heat exchanging device including a limited heat exchanging housing for increasing the heat exchanging effect.

The other objective of the present invention is to provide a heat exchanging device for forcing the fluid to exchange heat within a limited heat exchanging housing and for increasing the heat exchanging effect.

The further objective of the present invention is to provide a heat exchanging device including an increased heat exchanging speed.

In accordance with one aspect of the invention, there is provided a heat exchanging device comprising a container for receiving a fluid and including an upper portion and a lower portion, a housing including an upper portion and a lower portion communicating with the upper portion and the lower portion of the container respectively, a tube extended through the housing for receiving another fluid, and means for pumping the fluid in the container to flow through the housing and to have a heat exchange with the fluid in

the tube. For example, only the heated fluid or the fluid of higher temperature may flow upward to the upper portion of the container and may flow into the housing via the upper portion of the housing for quickly heat exchanging with the fluid flowing through the tube.

The pumping means includes a first driving device disposed in the housing to pump the fluid in the container to flow through the housing. The first driving device may be such as a paddle wheel disposed in the housing.

The pumping means includes means for rotating the first driving device. The rotating means includes a second driving device arranged close to the first driving device, and means for actuating the first driving device.

The actuating means includes at least one first magnetic member disposed in the first driving device, and at least one second magnetic member disposed in the second driving device and actuated with the first magnetic member of the first driving device for magnetically attracting and actuating the first driving device. The second driving device may be disposed in the tube for being driven by the fluid flowing through the tube.

A casing is further provided and disposed in the housing for forming and defining a peripheral chamber

between the housing and the casing, the casing includes an upper portion and a lower portion, and the tube is extended through the casing and extended outward from the lower portion of the casing and extended upward through the peripheral chamber formed between the housing and the casing. The tube preferably includes a coil portion engaged in the peripheral chamber formed between the housing and the casing for further increasing the heat exchanging effect.

A device may further be provided for heating the fluid received in said container and includes a pipe for receiving a fluid and engaged into the housing for allowing the fluids in the pipe and the housing to have a heat exchanging action therebetween.

The heating means includes an evaporator coupled to the pipe, and a compressor coupled to the evaporator and the pipe for pumping the fluid through the pipe.

A casing is further provided and disposed in the housing for forming and defining a peripheral chamber between the housing and the casing, the pipe is engaged in the casing.

The casing includes an upper portion and a lower portion, and the tube is extended through the casing and includes a coil portion disposed in the lower portion of the casing.

Further objectives and advantages of the present invention will become apparent from a careful reading

of a detailed description provided hereinbelow, with appropriate reference to accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan schematic view illustrating a typical heat exchanging device having a tubing engaged or extended through a tank;

FIG. 2 is a cross sectional view illustrating another typical heat exchanging device having a heater disposed in a tank for heating the fluid received in the tank;

FIG. 3 is a cross sectional view illustrating a heat exchanging device in accordance with the present invention;

FIG. 4 is an enlarged partial cross sectional view of the heat exchanging device;

FIG. 5 is a cross sectional view taken along lines 5-5 of FIG. 4;

FIG. 6 is a plan schematic view illustrating a portion of a paddle wheel;

FIG. 7 is a perspective view illustrating a further embodiment of the heat exchanging device in accordance with the present invention;

FIG. 8 is an enlarged partial plan schematic view illustrating the driving wheel devices for the heat exchanging device; and

FIGS. 9, 10, 11 are plan schematic views illustrating the other embodiments of the heat

exchanging device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, and initially to FIGS. 3 and 4, a heat exchanging device in accordance with the present invention comprises a container 20 including a chamber 21 formed therein for receiving a water, a heat exchanging media, or the like therein which is received in the chamber 21 of the container 20 and need not flow into and out of the container 20. The container 20 will not be subjected with a high pressure and is not required to be formed into cylindrical shape, and may be formed into a parallelepiped shape or the other shapes, and may thus be disposed in any suitable positions or corners of the buildings.

A housing 22 is disposed in the container 10 and preferably includes a volume less than that of the container 10, and includes a chamber 23 formed or provided therein, and includes an open top and an open bottom, for allowing the water or the fluid received in the container 10 to flow into and out of the housing 22. A partition or a casing 24 is further provided and disposed in the chamber 23 of the housing 22, and includes a volume less than that of the housing 22, such that the chamber 23 of the housing 22 may be formed as a peripheral chamber 23 between the housing 22 and the casing 24. The casing 24 also includes a chamber 25 formed or provided therein and includes an

open top and an open bottom, for allowing the water or the fluid received in the container 10 to flow into and out of the casing 24.

A heater 30, such as an electric heater, or the other heater, may further be provided or may be selectively provided and disposed in the container 20, or may preferably be disposed in the casing 24, such as disposed in the bottom or the lower portion of the casing 24 for heating the fluid received in the casing 24 and in the container 20. The heated fluid may flow upward to the upper portion of the container 20 and the housing 22 and the casing 24 due to a heat convection and may flow into the upper portion of the housing 22 via the peripheral chamber 23 of the housing 22. The heater 30 may also be an electric heater disposed in the container 20 for heating the fluid in the container 20. The heated fluid or the fluid of higher temperature may also flow upward to the upper portion of the container 20.

For example, as shown in FIG. 3, the heater 30 includes a pipe 32 coupled to an evaporator 31 or the like for receiving the heat media from the evaporator 31 and for allowing the heat media to flow from the pipe 32 backward to the evaporator 31. The heater 30 includes a coil portion (30) formed in the lower portion thereof and preferably engaged in the middle or the lower portion of the casing 24. A compressor 33 may

compress and force the heat media from the evaporator 31 into the pipe 32 such that the heat media may flow into and through the pipe 32 in a high temperature and a high pressure status. The high temperature of the heat media in the pipe 32 may have a heat exchange with the fluid flowing through the casing 24 or received in the casing 24, such that the pipe 32 may be formed as a condenser and may be used to heat the fluid in the casing 24. The heated fluid may thus flow upward to the upper portion of the container 20 and the housing 22 and the casing 24 due to the heat convection.

A tube 40 is engaged into the upper portion of the casing 24 and engaged through the chamber 25 of the casing 24, and extended downward and outward of the casing 24, and then extended upward through the peripheral chamber 23 of the housing 22, and has an outlet extended or engaged outward of the container 20, for allowing the water to flow in the tube 40 through the casing 24 and then to flow through the peripheral chamber 23 of the housing 22. The water in the tube 40 may first be preheated by the heated fluid in the casing 24 that has been heated by the heater 30 and that flows upward of the casing 24 due to the heat convection. The tube 40 may include a winding or a coil shape portion 41 formed in the middle portion thereof and provided and engaged in the peripheral chamber 23 of the housing 22 for increasing the heat exchanging

effect.

As shown in FIGS. 3-8, a driving device 45, such as a paddle wheel 45 may be disposed and engaged around the bottom portion of the housing 22 and is disposed or engaged in the tube 40, such that the driving device 45 may be forced and driven and paddled by the fluid that flows through the tube 40. Another driving device 46, such as a fan device, a paddle wheel 46 or the like may be disposed and engaged in the bottom portion of the housing 22 and engaged around the casing 24, such as engaged in the bottom portion of the peripheral chamber 23 of the housing 22. The driving devices 45, 46 each includes one or more magnetic members 47, 48 disposed therein and actuated with each other for allowing the driving device 46 to be forced and driven by the other driving device 45 via the magnetic members 47, 48.

It is to be noted that the driving device 46 disposed in the housing 22, particularly disposed in the bottom portion of the peripheral chamber 23 of the housing 22 may be arranged to force or to pump the fluid to flow downward through the housing 22, such that the heater or the heated fluid in the upper portion of the container 20 and in the upper portion of the casing 24 may be forced or drawn into the hosing 22, particularly may be drawn into and through the peripheral chamber 23 of the housing 22, and such that only the heated fluid or the fluid of higher

temperature may be forced or pumped to flow into and to flow downward through the peripheral chamber 22 of the housing 22. The fluid received in the tube 40 may thus be effectively heated by the heated fluid or the fluid of higher temperature that flows downward through the peripheral chamber 22 of the housing 22. The heat exchanging effect between the fluids received in the tube 40 and the housing 22 may thus be increased.

Referring next to FIGS. 7, 8, alternatively, the heat exchanging device may include a housing 22 disposed in the container 20, and the tube 40 engaged through the housing 22. The driving devices 45, 46 may also be pumped or driven by the fluid flowing through the tube 40 and may be used to pump the fluid of higher temperature to flow into the housing 22 from the upper portion of the housing 22, such that the fluid of higher temperature may have an increased heat exchanging effect with the fluid of the tube 40.

Referring next to FIG. 9, further alternatively, the tube 40 may be engaged in the housing 22 and may be extended from the lower portion of the housing 22 upward through the housing 22, and may flow out of the upper portion of the housing 22. The driving device 45 in the tube 40 may also be driven by the fluid flowing through the tube 40 and may be disposed in the driving device 46 and may be used to drive the other driving device 46 which may also pump or drive the fluid of

higher temperature to flow into the housing 22 from the upper portion of the housing 22, such that the fluid of higher temperature may also have an increased heat exchanging effect with the fluid of the tube 40.

Referring next to FIG. 10, the housing 22 may be disposed outside of the container 20, and includes a lower portion and an upper portion coupled to the lower portion and the upper portion of the container 20 respectively with coupling conduits 70, 80 respectively, such that the heated fluid or the fluid of higher temperature in the container 20 may also flow upward to the upper portion of the container 20 and may also flow into the housing 22 via the upper portion of the housing 22 and may also have an increased heat exchanging effect with the fluid of the tube 40.

Referring next to FIG. 11, the container 20 may be used to receive the cold water or the cold media therein. The hot water or the hot fluid may flow in the tube 40 through the housing 22. The driving device 45 may also be driven by the fluid flowing through the tube 40 and may be used to drive the other driving device 46 which may be arranged to pump the colder water in the lower portion of the container 20 upward through the housing 22 to have an increased heat exchanging effect with the fluid in the tube 40, and for allowing the hot water in the tube 40 to be quickly cooled to the lower temperature.

It is to be noted that, in operation, the housing 22 may be disposed in or out of the container 20 and is arranged for allowing only the fluid of higher temperature in the upper portion of the container 20 to flow into the housing 22 and to have an increased heat exchanging effect with the fluid of the tube 40 that extends through the housing 22. The driving device 45 may be actuated by the fluid flowing through the tube 40, and may be used to drive and actuate the other driving device 46. The driving device 46 may be used to force or to pump the fluid of higher temperature in the upper portion of the container 20 to flow into the upper portion of the housing 22. The heater 30 may be selectively provided and disposed in the container 20 or in the casing 24.

Accordingly, the heat exchanging device in accordance with the present invention includes a limited heat exchanging housing for increasing the heat exchanging effect.

Although this invention has been described with a certain degree of particularity, it is to be understood that the present disclosure has been made by way of example only and that numerous changes in the detailed construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.